

REMARKS

Claims 19-47 were pending in this application. Claims 19, 23, 24, 29, 30, and 36 have been amended hereby and new claims 48-77 have been added to complete the scope of protection to which Applicants are entitled. Accordingly, claims 19-77 are now pending in this application and are believed to be in condition for allowance for the reasons stated below.

With respect to the paragraph 4 and paragraph 6, 35 U.S.C. §112, second paragraph rejections outlined in the Office Action, Applicants have amended the claims to recite the deposition of a silicon nitride layer and to provide proper antecedent basis for "said selected portion" recited in claim 36. Accordingly, Applicants respectfully request that the §112, second paragraph rejections of claim 29-32, 36-39, 42, 43, 46 and 47 be reconsidered and withdrawn.

Paragraph 9 of the Office Action rejected claims 29, 30, 33, 35, 36, 38, 39, 42, 43, 46 and 47 under 35 U.S.C. §102(e) as allegedly being anticipated by Zhang et al. '772. Further, paragraph 11 of the Office Action rejected claims 29-39, 42, 43, 46 and 47 under 35 U.S.C. §103 (a) over Zhang et al. '772. These grounds of rejection are respectfully traversed for the following reasons.

The present invention is directed to crystallizing a semiconductor film which is in contact with a silicon nitride film. After crystallizing, the semiconductor film does not have a "111" plane orientation. Further, in accordance with the present invention and as now recited in the amended and new claims, the silicon nitride film contains at least one of hydrogen and

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oxygen. This feature of the present invention is supported in the present specification at page 3, lines 20-25 thereof.

Applicants note that under §102 a single reference must disclose each and every feature recited by the claims. Further, under §103 the burden of establishing a prima facie case of obviousness lies with the Patent Office. In re Fine, 5 USPQ2d 1596 (Fed. Cir. 1988). To establish a prima facie case of obviousness, there must be (1) some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to modify the reference or to combine reference teachings to achieve the claimed invention and (2) the prior art must teach or suggest all the claim limitations. MPEP §2143. Also, simply because the references could be does not mean that they should be. MPEP §2143.01, citing In re Mills, 16 USPQ2d 1430 (Fed. Cir. 1990).

Applicants respectfully submit that Zhang et al. '772 fails to anticipate under §102 and fails to render obvious under §103 the presently claimed invention.

Specifically, Zhang et al. teach that a surface of a semiconductor is covered by a silicon nitride coating film, (cover film), column 8, lines 11-15, and further teach silicon oxinitride (SiN_xO_y) may be used as the cover film. See Column 11, lines 1-3 of Zhang et al. However, Zhang et al. fail to teach or suggest a silicon nitride film containing at least one of hydrogen and oxygen employed as a base film formed between a substrate and a semiconductor film. Thus, Zhang et al. fail to disclose or to suggest at least one feature expressly recited in the claims. As such, the §102 and §103 rejections based on that reference should be withdrawn.

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Further, applicants note that when silicon nitride film containing at least one of hydrogen and oxygen is used as a base film provided between a substrate and a semiconductor film, the base film prevents impurities in the substrate from diffusing to the semiconductor film. In the case of a thin film transistor comprising a substrate, a base film and a semiconductor film, the diffusion of impurities affect the electrical properties of the thin film transistor. Further, the crystallinity of the semiconductor film is dependent on the composition or other condition of the base film and the crystallinity affects the electrical properties of a thin film transistor. Accordingly, in accordance with the present invention, it is possible to change and improve the electrical properties of a thin film transistor by selecting the composition or other condition of the base film. In this particular instance, a silicon nitride film containing at least one of hydrogen and oxygen is employed. However, Zhang et al. fail to disclose such a composition.

Paragraph 12 of the Office Action rejected claims 19-28, 40, 41, 44 and 45 under 35 U.S.C. §103(a) over Yamazaki '327, Takayama '225 or Yamazaki '698. This ground of rejection is also respectfully traversed.

Applicants note that none of Yamazaki '327, Takayama '225 or Yamazaki '698 discloses or suggests a silicon nitride film containing at least one of hydrogen and oxygen used as a base film formed in between a substrate and a semiconductor film. Accordingly, since independent claims 19 and 24 have been amended to recite this feature of the present invention, Applicants respectfully request that the §103(a) rejection of those claims and the claims dependent thereon be reconsidered and withdrawn.

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Paragraph 14 of the Office Action rejected claims 19-47 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-26 of U.S. Patent No. 5,605,846. This ground of rejection is respectfully traversed for the following reasons.

Applicants note that none of claims 1-26 of the '846 patent recites a silicon nitride film containing at least one of hydrogen and oxygen. Moreover, it is respectfully submitted that such a composition of a silicon nitride film in no way can be gleaned from claims 1-26 of the '846 patent. Accordingly, Applicants respectfully request that the obviousness-type double patenting rejection based on claims 1-26 of U.S. Patent No. 5,605,846 be reconsidered and withdrawn.

Finally, it is noted that claims 19, 23, 24, 29, 30 and 36 have been amended to change "catalyst metal" to "metal". Generally, "catalyst" is typically understood to mean that the catalyst per se does not change. However, a metal which promotes crystallization of a semiconductor film comprising amorphous silicon is probably changed to metal silicide in the semiconductor film. Accordingly, to recite in the claims a "catalyst metal" might not be entirely appropriate and, as such, has been amended as set forth above.

In view of the above, all of the claims in this case are believed to be in condition for allowance. Should the Examiner deem that any further action by the Applicants would be desirable to place this application in even better condition for issue, he is requested to contact the undersigned.

Respectfully submitted,

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